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CENTRAL INTELLIGENCE AGENCY

# INFORMATION REPORT

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25-Ton Chamber

5. The 25-ton chamber was operated with an internal chamber pressure of approximately 16 atmospheres absolute pressure. An increase of internal pressure to 18 to 20 atmospheres absolute pressure in experimental testing led to the destruction of the chamber.

6. From mid-1948 a small series of this chamber was produced in Zavod 456, which was

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supplied to Zavod 88 in Moscow/Podlipki.

7.

25X1 the firing range at Stalingrad

25X1 en launchings were made, of

25X1 which only two had been completely successful.[2]

35-Ton Chamber

8. The 35-ton chamber was developed from the 25-ton chamber. The developmental work was completed in either fall 1948 or spring 1949.
25X1 firing tests with this propulsion unit were carried out in Stalingrad in
25X1 December 1949.

25X1 9. the most important technical aspect of this chamber was that at first 80 percent and later 85 percent alcohol was used. The chamber was constructed for a flow of 157 or 159 kilograms per second. 25X1
possible that a flow of 165 kilograms per second was obtained during testing.
25X1 However, no German learned precise figures from the test stand results. The ratio of the fuel to the oxygen carrier was between 0.79 and 0.81. According to the analytical calculations the exhaust
25X1 velocity was between 1,950 and 1,980 meters per second.[3] The internal pressure of the combustion chamber was 22 atmospheres absolute pressure.
25X1 the combustion period on the test stand several times at 90
25X1 seconds. Shorter combustion periods were attributed to misfiring. the 25X1
fuel and oxygen tanks on the test stand provided for a longer combustion period.
25X1
25X1 This circular tank held exactly 193 liters, or exactly 282 kilograms, the specific gravity of $H_2O_2$ being 1.465. Consequently, at a flow of about three kilograms per second, a combustion period
25X1 of 94 seconds can be reached. Furthermore, in the case of 90-second combustion periods the tank had to be enlarged from six meters to 11.1 meters and the overall length of the rocket from 14 meters to 19.1 meters. The
25X1 above is only a hypothesis
25X1

25X1 10. important construction changes: To attain perfect cooling within the chamber, it was necessary to build baffles in Rings I - IV. The purpose of these baffles was to produce uniform film cooling and to prevent the fuel from uselessly squirting into the interior of the combustion chamber. From the technical production standpoint, the ring consisted of a turning part; but, instead of the holes previously used, a slot was made on the transverse section of the old holes. After completion of the processing, the slot was milled to the calculated cross section. at Rings II and IV it is 25X1
important to keep the baffles at the exact angles. Reinforcements were placed in the chamber head to increase the mechanical stability. Since the film cooling at the lower end of the chamber was no longer adequate, regenerative cooling was conducted with ethyl alcohol up to the end of the nozzle. For this reason, the end ring had to be redesigned.

100-Ton Chamber

11. In 1948 the Soviets ordered a 100-ton chamber 25X1
25X1 In fall 1950, turbines and pumps were just completed. At the same time, a pump unit test stand was also completed, which was also to be used with the 250-ton chamber. The Soviets demanded direct current cooling
25X1 with water.
25X1

12. The most important technical data on the 100-ton chamber was the use of 85 percent



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alcohol, or, according to the Soviets, of petroleum. The total flow allegedly amounted to about 500 kilograms per second. In the use of 85 percent alcohol, the ratio of oxygen carrier to fuel was 1.25, or, inversely, 0.8. [redacted] 25X1
25X1 [redacted] the internal chamber pressure approximates 70 atmospheres absolute pressure.[4]

25X1 13. The 100-ton chamber was planned to be spherical with a straight nozzle. [redacted]
25X1
25X1 [redacted] The head is cooled by fuel, which is then carried through the fuel valve to the various split mixing
25X1 nozzles. Twelve mixing nozzles were provided in the head. [redacted] design for 18 turbulence nozzles was not approved by the Soviets at project conferences. The jacket of the spherical head and the nozzle itself were said to be cooled with water. Later on, a steam generating plant was to be installed. To lower the weight, a copper-lined steel outer jacket was provided. The copper inner jacket was to be of one piece, in which the necessary holes were to be cut and which was welded together with the steel outer jacket by crosspieces. The wall thickness of the copper jacket was planned at one millimeter at the thinnest
25X1 places. [redacted] extremely difficult to carry this out from the technical point of view, since this type of welding had, up to that time, never 25X1 been tested.

14. [redacted]
25X1 [redacted] the only newly added elements were the peroxide pump on the fuel side and a water pump on the fuel (sic) side. Later on, the pump unit was to be driven by steam, which is to be taken at the lower end of the nozzle from the cooling water circulation.

Eight-Ton Test Chamber

15. As a preliminary experimental device for the 100-ton chamber, an eight-ton test chamber with 70 atmospheres absolute internal pressure was built by the Soviets. The chamber was built in the shape of a cylinder to test the injection process by means of a mixing nozzle. The mixing nozzle consists of a split mixing nozzle in contrast to the other straight-bore mixing nozzles. The splits can be enlarged or reduced by exchanging the rings. The jacket was built according to the system for the 100-ton chamber. First a copper cylinder with a wall thickness of five millimeters was made. Then small channels were cut so that the wall thickness at the thinnest places was one millimeter. Then the steel outer jacket was fitted. The soldering took place in a chamber especially constructed for it. Source stated that the soldering caused great difficulties and was not absolutely perfect.[5]

V-1 Production

25X1 16. [redacted] at Zavod 456 in Khimki in 1946, a special serial production of the German V-1 was being carried out, which was transferred to another factory in mid-1948.

Factory for Assisted Take-Offs

25X1 17. [redacted] Walther propulsion units with a capacity of about 300 kgp were built at Zavod 290, a small factory located north of Zavod 456. [redacted] 25X1
25X1 [redacted] nine control points for the nozzle of such a propulsion unit. [redacted]
25X1 [redacted] whether these control points could also be built into more powerful propulsion units of about 600 kgp. The propulsion
25X1 units were tested on twin-engined aircraft. After launching, the propulsion units were dropped by parachute. The propulsion unit had the shape of a long cigar and was switched off and on during flight.



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Parasite Aircraft or Wing Bombs

25X1 [redacted] twin-engined or possibly also four-engined aircraft at the Khimki airfield, under the wings of which small aircraft-like bodies were attached. When the aircraft returned from a flight, the previously attached flying missiles were missing.

25X1 [redacted] Comments:

25X1 1. [redacted] the combustion tests took place in Lehesten.

25X1 2. [redacted] probably referring to the small series of Apparatus 101, which, 25X1 [redacted] was produced at a rate of ten units per month. [redacted] the small series suffered a total 25X1 loss of 50 percent at first, but [redacted] it was all right after six months. 25X1

3. According to technical calculations, it is estimated that a flow of 157 kilograms per second and an exhaust velocity of 1,975 meters per second would result in a thrust of 31.6 tons. A thrust of 35 tons could be reached only with a flow of 165 kilograms per second and an exhaust velocity of 2,080 meters per second. Thus, the figures [redacted] are too low. 25X1

4. According to technical calculations, one kilogram of alcohol (85 percent by weight) needs at least 1.8 kilograms of oxygen for total combustion. 25X1 [redacted] it should read :

$$\frac{\text{Fuel}}{\text{Oxygen carrier}} = 0.56$$

or inversely,

$$\frac{\text{Oxygen carrier}}{\text{Fuel}} = 1.80$$

25X1 5. [redacted] this test chamber had a seven-ton thrust and 25 atmopsheres absolute internal pressure.

25X1 [redacted] (Army 2, Navy 1, Air 2, ATIC 2, OSI 2, OCD 4)

25X1 [redacted]



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